Chlamydoconcha orcutti Dall: Review and Distribution of a Little-Known Bivalve

BY

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The internally-shelled epifaunal veneroid clam *Chlamydoconcha orcutti* was named as a new genus and species by William Healey Dall in 1884 based upon specimens collected by Charles R. Orcutt in Mission Bay (formerly False Bay), San Diego County, California. It is doubtful if any semblance of the exact locality within Mission Bay that Orcutt visited still exists (see, for example: Orcutt, 1919: 64; Morrison, 1952, 1954, 1957; Chapman, 1963). This note brings together an obscure and scattered literature, summarizes available ecological data, documents further localities, corrects a recent literature statement concerning *Chlamydoconcha,* and establishes type material. The range is extended north to Shell Beach, Sonoma County, California (38°25′20″N; 128° 07′00″W) and south to Punta San Pablo, on the Pacific coast of Baja California Norte (27°12′30″N; 114°28′50″ W).

The family Chlamydoconchidae, erected by Dall (1884, as the family "Chlamydoconchae"; not 1889 (Abbott, 1974) and not 1899 (Keen, 1969), in which *Chlamydoconcha* is placed, has been used by most American workers (Keep, 1904, as Chlamydochonchidae; Oldroyd, 1925; Keep & Baily, 1935; Burch, 1944; Smith & Gordon, 1948; Keen, 1969; Keen & Coan, 1974; Abbott, 1974). Thiele (1934) regarded it as a subfamily (Chlamydoconchinae) of the Erycinidae, perhaps influenced by the remarks of Fischer (1887a, 1887b) and Bernard (1897a, 1897b). Götting (1974) placed *Chlamydoconcha* in the Leptonidae. Its placement in the Erycinidae or Leptonidae, however, is incompatible with current diagnoses of either family (see Chavan, 1969; Keen, 1971). Keen (1969) erected the superfamily Chlamydoconchacea, removing *Chlamydoconcha* from its placement in the Erycinacea (Leptonacea) (Dall, 1921; Thiele, 1934; Keen, 1963; Vokes, 1967).[1]

[1] The chiton genus *Chlamydoconcha* Pilsbry, 1893, a junior homonym, is a synonym of *Amicula* Gray, 1847 (Smith, 1960).

Studies on *Chlamydoconcha* have concerned its anatomy (Dall, 1884; Fischer, 1887a; Bernard, 1897a, 1897b), with brief remarks existing on its distribution and natural history (Williams, 1949; Turner & Ebert, 1962; Turner, Ebert & Given, 1969), and diet ("plankton," Johnson, 1953; "bacteria," Turner & Ebert, 1962). Mentions by Dall, 1899, 1916; Kelsey, 1907; Oldroyd, 1925, and Orcutt, 1885, 1900 and 1915b, cited occasionally in reference to *Chlamydoconcha,* are listings only, with no new information.

Table 1 summarizes the localities where *Chlamydoconcha* has been found. North of Point Conception, *C. orcutti* is known only from Sonoma and Monterey Counties. Previous Monterey records are old and few, without detailed information. In 1915, Orcutt reported that, "A single specimen of this curious clam ... is reported from Monterey bay, California." In 1919, Orcutt wrote again "... since reported from Monterey Bay by Dr. [S. Stillman] Berry." The source of Berry's record, if first published by other than Orcutt (as Orcutt's wording would appear to imply), has not been located; *Chlamydoconcha* does not appear in Berry's checklist of Monterey Bay mollusks (Berry, 1907, 1908). Whether Dall's (1921) citation is a repeat of Orcutt's listing cannot now be known. A second (or third) report from Monterey was that of Harold Heath of Hopkins Marine Station, of unknown date (Smith & Gordon, 1948).

A single specimen recovered subtidally at Shell Beach, Sonoma County, in 1969 by a University of California at Berkeley zoology student was brought to the Bodega Marine Laboratory and examined by Dr. Cadet H. Hand, myself, and others. Unfortunately, the specimen was not retained.

Chlamydoconcha has been found from the littoral zone to a depth of 38 m, often clinging to and crawling upon the undersides of rocks. It may be restricted further in some areas to rock substrates over detritus-rich mud and sand bottoms (Bernard, 1897b; Turner & Ebert, 1963).

Table 1

Records of *Chlamydoconcha orcutti*

Locality (Date, Collector)	Habitat	Authority, Depository
CALIFORNIA		
Sonoma Co.: Shell Beach State Park, 11.7 km north of Bodega Bay (17-V-1969)	sublittoral, about 9m?	specimen examined at Bodega Marine Laboratory (not preserved)
Monterey Co.: Monterey Bay		Orcutt, 1915a, 1919
Monterey Co.: "Monterey"		Dall, 1921
Monterey Co.: Monterey Bay: Pacific Grove	intertidal, on rocks	Heath, *in* Smith & Gordon, 1948; notes by Allyn G. Smith
Monterey Co.: Monterey Bay: Pacific Grove: Chase Reef (VIII.1971, A. J. Ferreira)	under rock, 15 m	CASIZ
Monterey Co.: Monterey Bay: off Monterey (6.VIII.1970, A. J. Ferreira)	under rock, about 30 m	MLML (no. M0013)
Monterey Co.: Carmel Submarine Canyon	on rocks, about 24 m	J. H. McLean *(in litt.)*
Santa Barbara Co.: Santa Barbara		Johnson, 1953; Turner, Ebert, & Given, 1969
Santa Barbara Co.: Hope Ranch Beach (10.XI.1967, S. Spaulding)	kelp holdfast	SBMNH (no. 25073)
Channel Islands: Santa Cruz, Anacapa, Santa Catalina, and San Clemente	under rocks, 3 to 38 m at Santa Catalina	Turner & Ebert, 1962; Turner, Ebert, & Given, 1969
Los Angeles Co.: Santa Monica Bay	crawling on rock undersides and stones in detritus-rich sandy-mud areas; to 18.3 m; 7 to 10 specimens under a single small flat rock	Turner & Ebert, 1962; Turner, Ebert, & Given, 1969; UCMP; LACM; USNM (no. 576192)
Orange Co.: Newport Bay (1929, Lowe; others, no date)		E. M. & E. P. Chace; M. Caruthers; H. Lowe, all *in* Burch, 1944
San Diego Co.: La Jolla: Bird Rock (16.VIII.1927, P. Barnhart)		Williams, 1949; CASIZ (no. G-32760)
San Diego Co.: San Diego: Point Medanos (near entrance to Mission Bay) (I.1948, W. Williams)		CASIZ (no. G-32759)
San Diego Co.: San Diego: Mission Bay (False Bay)	on the shore, anchored by a byssus to under sides of stones; on a muddy, stony bank and stony clam bed; under rocks	Dall, 1884; Orcutt, 1885; Bernard, 1897b; Orcutt, 1915a; the Chaces, *in* Burch, 1944; Johnson, 1945; Williams, 1949; USNM (nos. 107222-107234; 758567-758568); CASIZ (no. G-32761; 27.IX.1946, W. Williams)
San Diego Co.: off Imperial Beach (9.X.1946, *E. W. Scripps*, Kenyon, Williams)	dredged on kelp; rocky bottom with heavy algal growth	Williams, 1949; CASIZ (no. G-32758)
BAJA CALIFORNIA NORTE, MEXICO		
Isla Cedros Island (ca. 1930s)		Walter Everdam collection (Frank Bernard, *in litt.*)
Punta San Pablo (25.X.1971, *R. V. Searcher*, J. H. McLean, P. LaFollette)	rocky pinnacles off point, sand base, strong surface current, 21-30 m	LACM (no. 71-178)

In Santa Monica Bay, it has been observed in the fall and winter (August to January, with occasional individuals in April), reaching population peaks about October (Turner, Ebert & Given, 1969). It has also been recorded in April at Santa Catalina Island (Turner & Ebert, 1962). All other records (Table 1) are based upon fall and winter collections (August, October, November or January) with the exception of the Shell Beach specimen, found in May. Two records are from kelp or kelp holdfasts (Santa Barbara and San Diego Counties), both also associated with rock bottoms. Williams (1949) stated *Chlamydoconcha* was found beneath rocks, cling-

ing to dead shells of old rock oysters, *Chama* sp., but did not indicate a specific locality. North (1976) described it as occurring "beneath flat rocks and ledges," to depths of 27 m, in southern California. Its principally inner sublittoral occurrence and its rarity in the intertidal zone may account for the relatively few records.

In 1974, Solem (pp. 81 - 82) made the following statement: "Until recently it was believed that a genus of clams found off Western North America, *Chlamydoconcha,* was a permanently swimming member of the plankton, with completely internal shell. A study issued early in 1973 concluded that this genus was based on exceptionally long-lived larvae. It is not yet known to which adult clam these larvae belong, but the absence of any reproductively mature examples of *Chlamydoconcha* strongly suggests that this conclusion is correct." These remarks actually concern the North and South Atlantic galeommatacean clam *Planktomya* (see Allen & Scheltema, 1972). *Chlamydoconcha* has never been recorded in the plankton or as a planktonic animal, and reproductively mature specimens are known (Bernard, 1897b).

The type series of *Chlamydoconcha orcutti,* not located at the time of preparation of the catalogue of Dall's taxa (Boss *et al.*, 1968) has since been found in the National Museum of Natural History (Smithsonian Institution) wet (alcoholic) collections. This material (old alcoholic series no. 2015) consists of a bottle, with a neck-label reading "San Diego C. R. Orcutt," in which are 4 vials. One vial contains one dissected specimen and one entire specimen (the latter here designated the **lectotype**, US NM 758567, 10.1 mm in length and 9.4 mm in width; the former, a **paralectotype**, here designated, USNM 758568). A second vial contains 5 entire specimens (**paralectotypes**, here designated, USNM 758568). Two small vials contain shell fragments from the dissected specimen. The arrangement of the material into one dissected specimen, shells, and whole specimens, clearly corresponds with Dall's original remarks and description of the species. In addition, there are 7 slides (J125 - J131, USNM 107222-107234) of one entire animal which has been serially sectioned. The catalogue entry (of October 16, 1894) indicates that this specimen was received from J. A. Ryder, and collected by C. Orcutt from False Bay (= Mission Bay). Mount (1973) has indicated the presence of a syntype (which can now be regarded as a paralectotype) of *Chlamydoconcha* in the C. R. Orcutt collection now at the University of California at Riverside.

Specimens examined are at the University of California, Berkeley, Museum of Paleontology (UCMP), California Academy of Sciences, San Francisco, Department of Invertebrate Zoology (CASIZ), Moss Landing Marine Laboratories, Moss Landing, California (MLML), Santa Barbara Museum of Natural History (SBMNH), the Los Angeles County Museum of Natural History (LA CM), and the National Museum of Natural History [NMNH, numbers of the United States National Museum (USNM)].

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